National Institute of Environmental Health Sciences

The role of climate variability and change in the transmission dynamics and geographic distribution of dengue

Author(s): Thai KT, anders KL
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Abstract:

The mounting evidence for anthropogenic changes in global climate raises many pressing questions about the potential effects on biological systems, and in particular the transmission of infectious diseases. Vector-borne diseases, such as dengue, may be particularly sensitive to both periodic fluctuations and sustained changes in global and local climates, because vector biology and viral replication are temperature- and moisture-dependent. This paper reviews the current state of knowledge on the associations between climate variability, climate change and dengue transmission, and the tools being used to quantify these associations. The underlying causes of dengue's recent global expansion are multifactorial and poorly understood, but climatic factors should be considered within the context of the sociodemographic, economic and immunological determinants that have contributed to dengue's spread. These factors may mediate the direct effects of climate on dengue and many may operate at a very local level. Translating theoretical models of dengue transmission based on historical data into predictive models that can inform public health interventions is a critical next step and efforts should be focused on developing and refining models at smaller spatial scales to characterize the relationships between both climatic and non-climatic factors and dengue risk.

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Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Precipitation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Dengue

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Methodology

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content